

Introduction

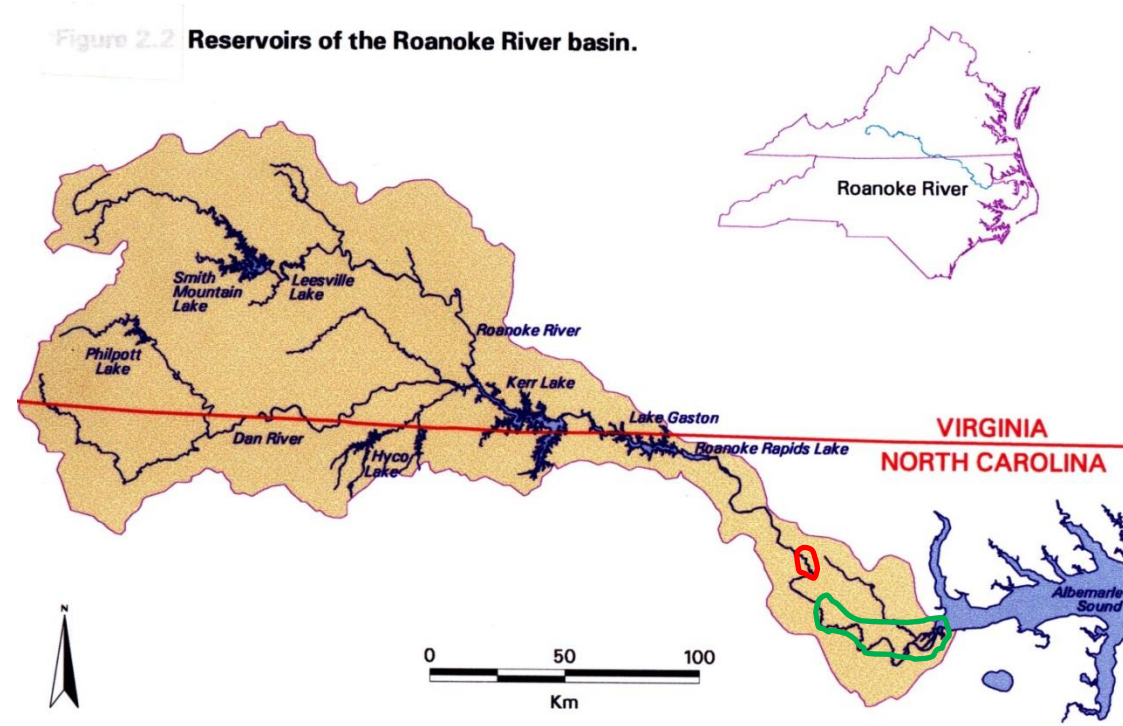
The following is a brief introduction to the flow issues on the Roanoke River and designed to give you some background before reviewing the erosion study completed by VATEch. There are two VATEch reports the 2009 report goes into much detail on the techniques used and their 2010 report describes the work citing the 2009 report and summarizes overall findings. Some of the concerns we have are bulleted below I am not sure they are valid:

- Study area only covers an eight mile stretch of the river of the 137 miles downstream of the last dam, however, of the 137 miles, 25 miles is basically at sea level so no levee is evident for the lower 25 miles of the river.
- Study occurred in an area where bank erosion is currently at a minimum. Most of the active bank erosion is occurring beginning approximately 15 miles downstream of their study site, however the change in river stage is greater up at their study site.
- Techniques used are too site specific and results may not be able to be extrapolated even within the eight mile area of their study site.

Background

The largest flood on record for the lower Roanoke River occurred in 1940 with a maximum magnitude of 254,000 cfs. Following this flood event, four dams were commissioned, three of which are positioned just above the fall line and influence flows on the 137 miles of free flowing river before it empties into the Albemarle Sound. The position of the three dams from upstream to downstream is the USACE's John H. Kerr flood control project (completed in 1953), Gaston (completed in 1963) and Roanoke Rapids dam (completed in 1955). The latter two are for profit hydropower facilities owned and operated by Dominion Power.

Figure 1. Roanoke River Basin map showing locations of reservoirs. Refuge lands fall within outlined area in green and red outlined area is the VATEch study site.



The operation of the three dams is complex I will attempt to simplify it here for the sake of brevity. When Kerr is not operating for flood control, the USACE, in cooperation with the federal Southeastern Power Administration (hydropower regulators at the USACE's John H. Kerr dam) makes a weekly water declaration to Dominion Power. Within-week allocations are made primarily by Dominion according to demand. At Roanoke Rapids, Dominion can use daily water allocations and peak within-day or within-week during certain times of the year (peaking ceases from March 1 – June 15 during the anadromous fish spawn so Dominion operates Roanoke Rapids in a “run of Kerr” mode). Due to storage of water behind Kerr Dam, discharges at Roanoke Rapids Dam of greater than 30,000 cfs have occurred only 8 times in the post-dam era and have never exceeded 41,000 cfs. As a consequence, the lower Roanoke River floodplain experiences far fewer high flows than was the case before dam construction, but as a consequence moderate flooding is often much prolonged (figure 3).

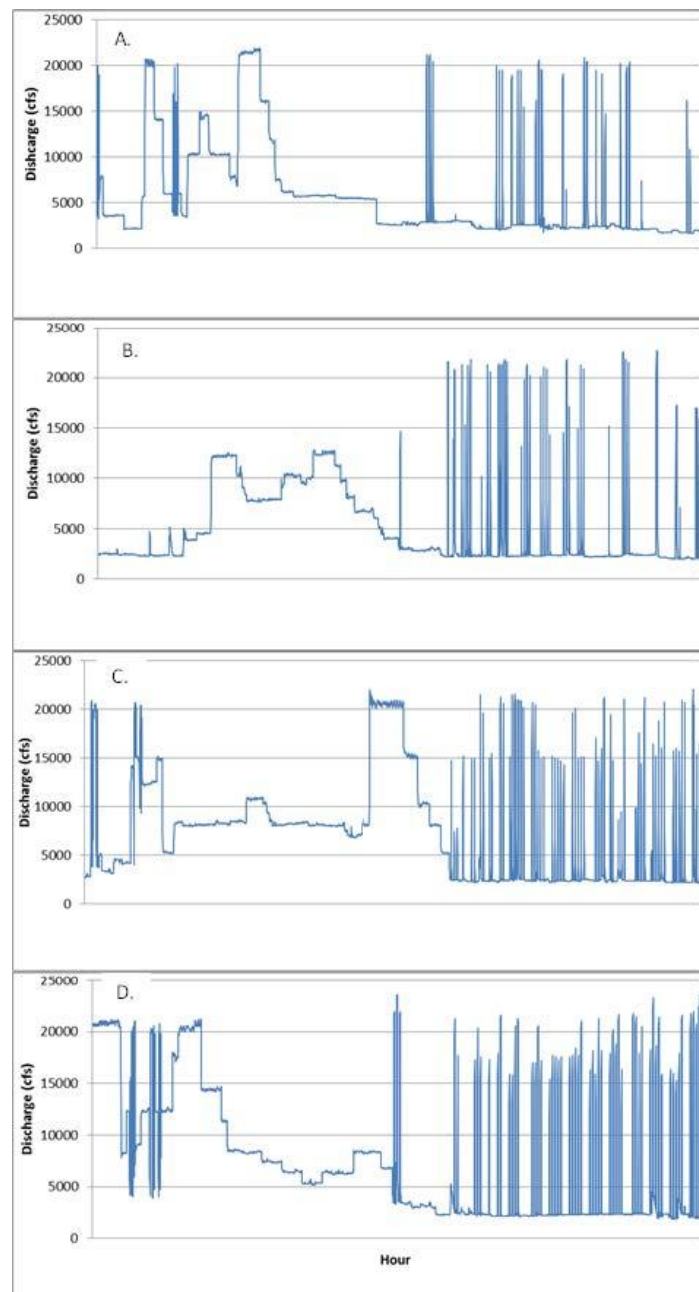


Figure 2. 2007-2010 growing season hydrographs (March 1 – September 30).

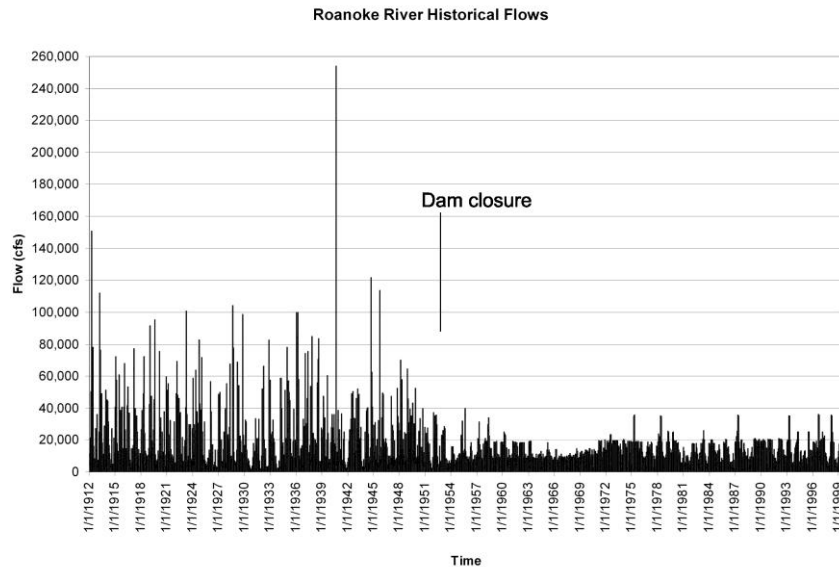


Figure 3. Daily average discharges from Roanoke Rapids Dam 1912 – 1953 pre-dam to 1954-1999 post dam.

Under terms of the Roanoke Rapids and Gaston Comprehensive Settlement Agreement and the FERC license order issued March 31, 2004 and amended March 4, 2005 Dominion is required to monitor, evaluate, and, if determined to be necessary, reduce the contribution of the licensee's (Dominion's) within-day peaking operations to bank erosion in the Roanoke River downstream from the Roanoke Rapids dam.

Occurring simultaneously but completely independent of Dominion's obligations under its new license is a review of the USACE's John H. Kerr flood control project for impacts to the river and floodplain system downstream of Roanoke Rapids Dam. This particular review process of the USACE project is known as a Section 216 Study; a section in the River and Harbor and Flood Control Act of 1970. Since USACE projects are not issued licenses by the FERC they do not go through a formal relicensing however if stakeholders show enough concern over how a USACE project is being managed a Section 216 can be authorized by Congress as was done on the Roanoke River.

Focusing only on bank erosion, there were two semi-independent studies that were funded on the Roanoke River. The USACE funded the USGS to look at whether bank erosion downstream of the dams was accelerated due to the managed flow regime on the river, specifically flood control. Cliff Hupp and Ed Schenk of the USGS carried out the work. Dominion contracted with VATEch to look at the effects of peaking on bank stability. The USGS study could not tease out what flow regimes flood control releases or hydro peaking releases, that were causing bank erosion. Since the USACE was wanting to find out what flows triggered bank erosion e.g., how many weeks of 20,000 cfs, or would going up to 35,000 cfs cause the banks to become unstable etc., the USACE piggy-backed (by contributing money) onto the Dominion Study and had the investigators at VATEch analyze questions on bank stability looking at flood control releases in the 8 mile stretch of the river where the VATEch study was situated. The USACE's involvement is being mentioned so you understand why there is discussion in the VATEch studies on flood control discharges as well as hydropower peaking.